Name:

## at1124exam: Radicals and Squares (v927)

### Question 1

Simplify the radical expressions.

$\sqrt{28}$ $\sqrt{99}$ $\sqrt{27}$

$\sqrt{2 \cdot 2 \cdot 7}$ $\sqrt{3 \cdot 3 \cdot 11}$ $\sqrt{3 \cdot 3 \cdot 3}$

$2\sqrt{7}$ $3\sqrt{11}$ $3\sqrt{3}$

### Question 2

Find all solutions to the equation below:

$$\frac{(x-4)^2}{2} - 6 = 12$$

First, add 6 to both sides.

$$\frac{(x-4)^2}{2} = 18$$

Then, multiply both sides by 2.

$$(x-4)^2 = 36$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 4 = \pm 6$$

Add 4 to both sides.

$$x = 4 \pm 6$$

So the two solutions are $x = 10$ and $x = -2$.

**Question 3**

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 10x = 96$$

$$x^2 + 10x + 25 = 96 + 25$$
$$x^2 + 10x + 25 = 121$$
$$(x+5)^2 = 121$$
$$x + 5 = \pm 11$$
$$x = -5 \pm 11$$
$$x = 6 \quad \text{or} \quad x = -16$$

**Question 4**

Any quadratic function, with vertex at $(h, k)$, can be expressed in vertex form:

$$y = a(x-h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 3x^2 - 24x + 56$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 3 .

$$y = 3(x^2 - 8x) + 56$$

We want a perfect square. Halve -8 and square the result to get 16 . Add and subtract that value inside the parentheses.

$$y = 3(x^2 - 8x + 16 - 16) + 56$$

Factor the perfect-square trinomial.

$$y = 3((x-4)^2 - 16) + 56$$

Distribute the 3.

$$y = 3(x-4)^2 - 48 + 56$$

Combine the constants to get **vertex form**:

$$y = 3(x-4)^2 + 8$$

The vertex is at point $(4, 8)$.